

A comparison of hydrological impacts from two ensembles of regional climate projections with a range of climate sensitivities

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Supplementary Material

1 Methods

Orography data corresponding to the climate data are required as part of the Hydro-PE calculation and for the application of the G2G snow module. These data are available with UKCP18 Regional but not with EuroCORDEX-UK. The native orography was obtained from esgf-ui.ceda.ac.uk/cog/search/cordex-ceda/ and transformed to the required grid using the 'regrid' function within the Iris python package (scitools-iris.readthedocs.io/en/stable/). The native orography data were not available for the WRF RCM, and the regridding did not function for the ALADIN RCM, so these were excluded (Table 1).

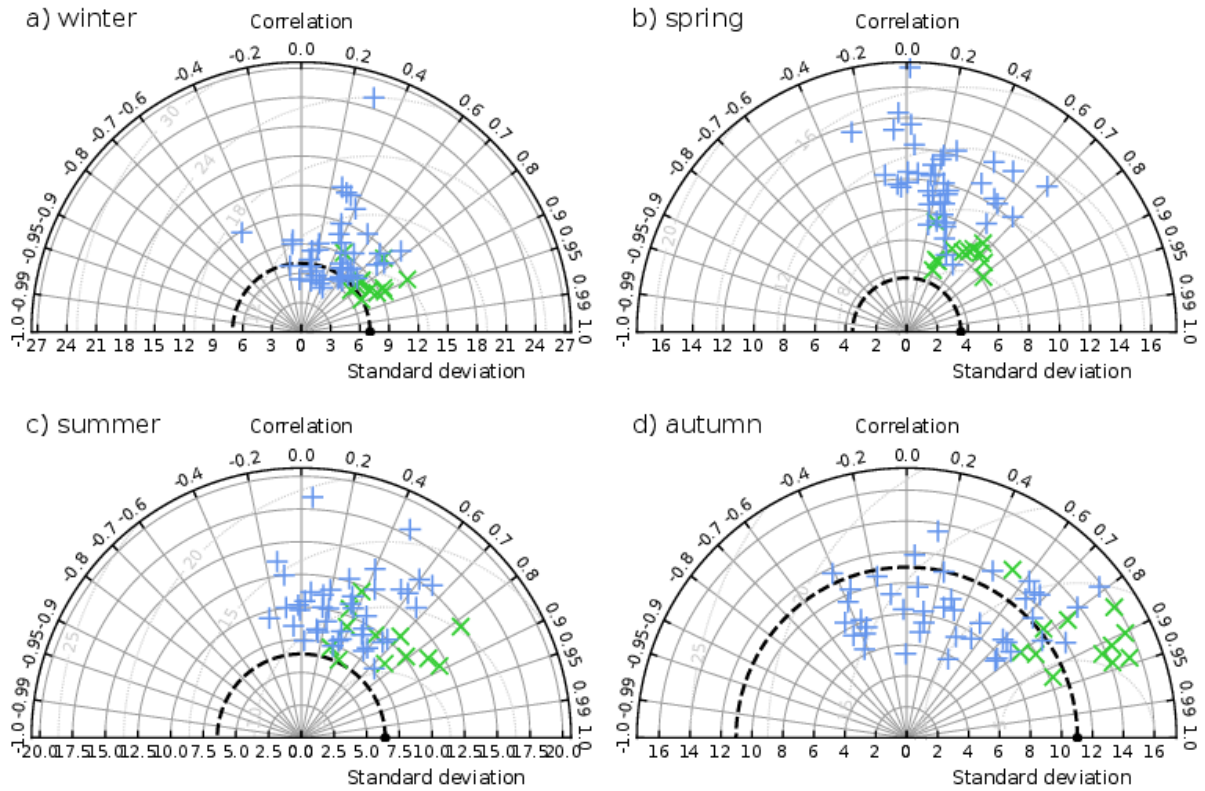
2 Results

Supp. Figure 1 shows Taylor diagrams comparing the spatial patterns of change in seasonal mean flows across GB for the 1deg-3deg time-slices.

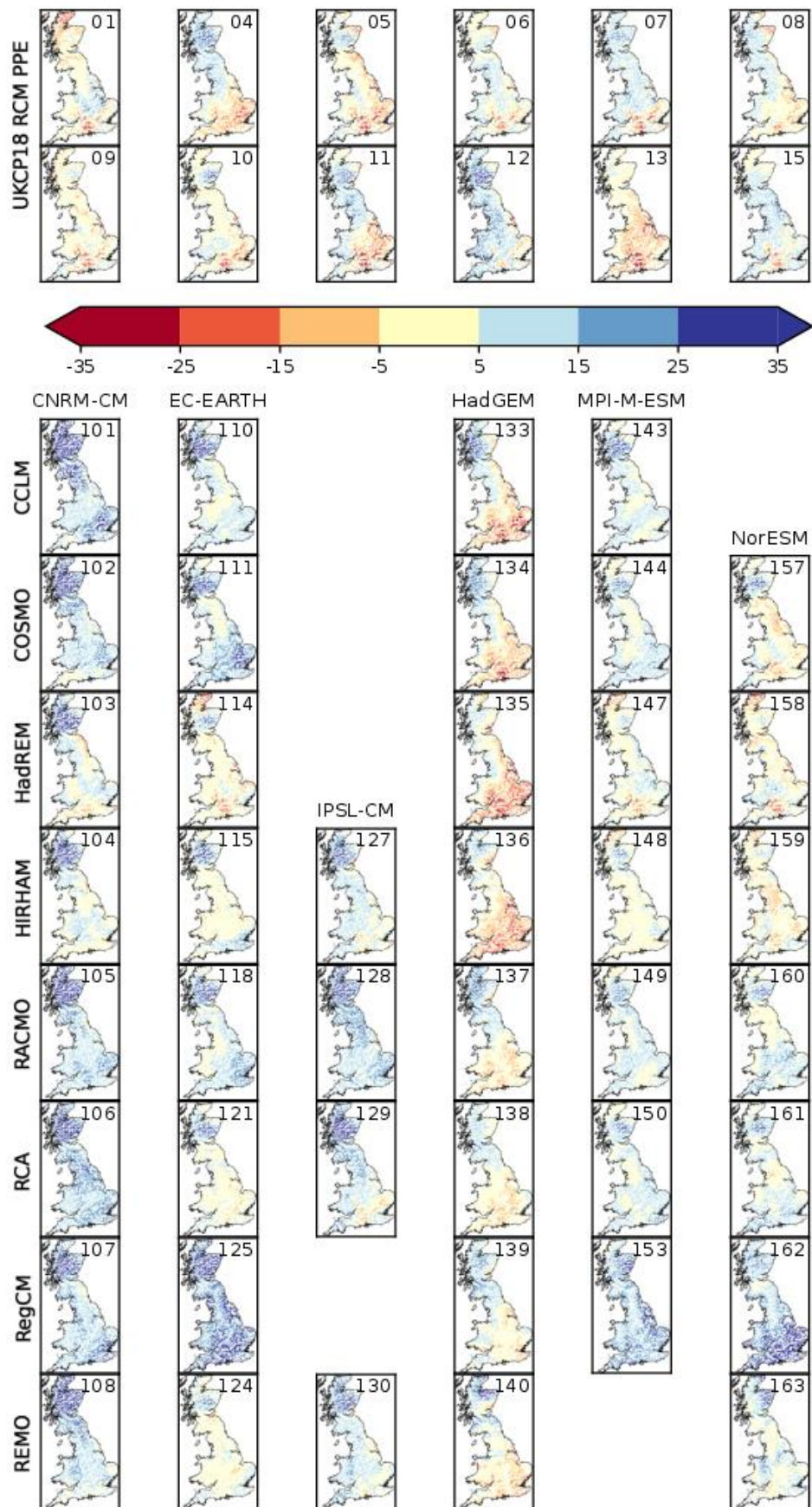
Supp. Figures 2-5 show maps of the percentage change in mean flows for winter, spring, summer and autumn respectively, for the UKCP18 and EC-UK ensembles, between for the 1deg-3deg time-slices.

Supp. Figure 6 shows Taylor diagrams comparing the spatial patterns of change in 5-year return period low flows and 5-year return period high flows across GB for the 1deg-3deg time-slices.

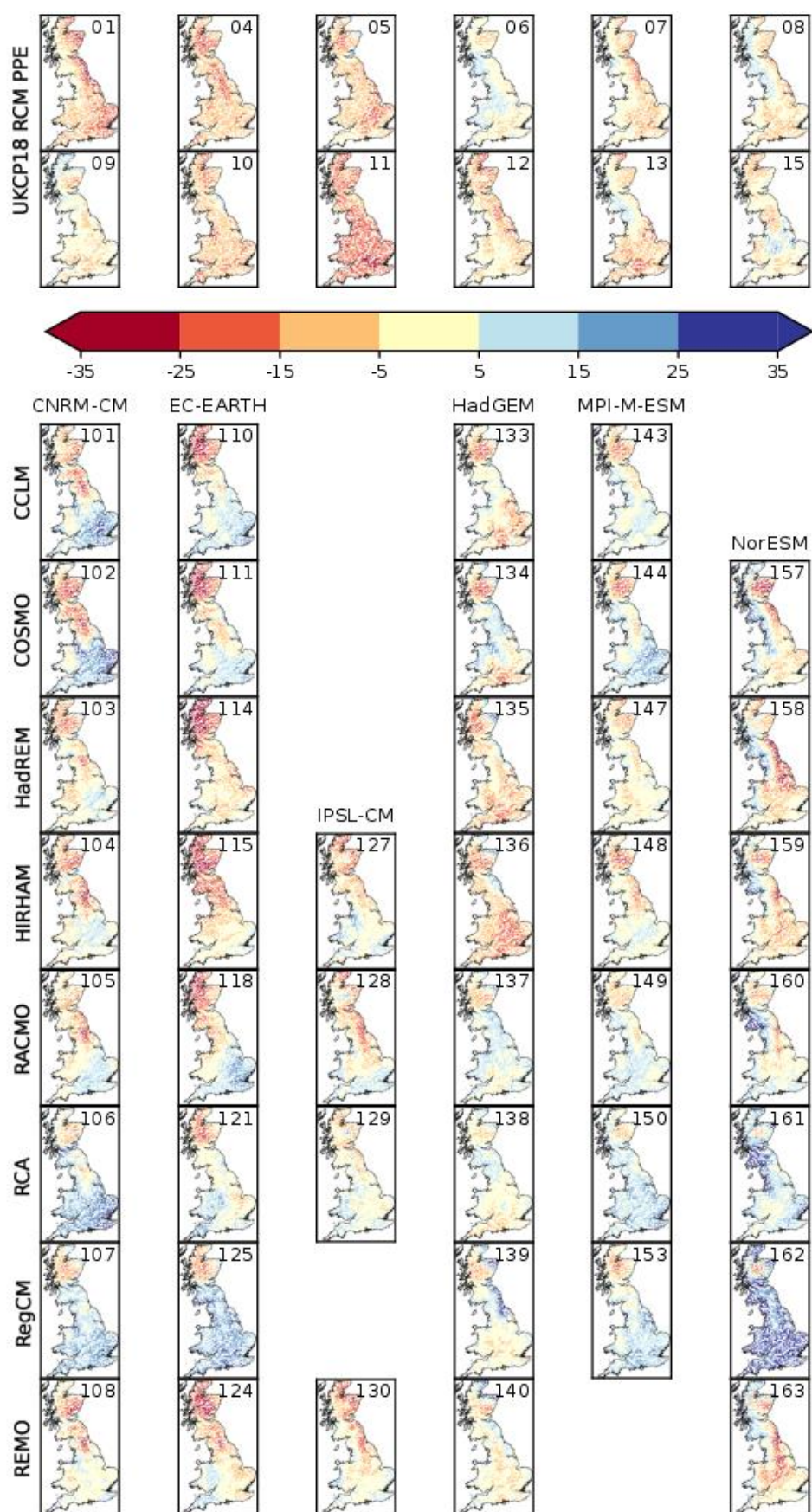
Supp. Figures 7-8 show maps of the percentage change in in 5-year return period low flows and 5-year return period high flows respectively, for the UKCP18 and EC-UK ensembles, for the 1deg-3deg time-slices.



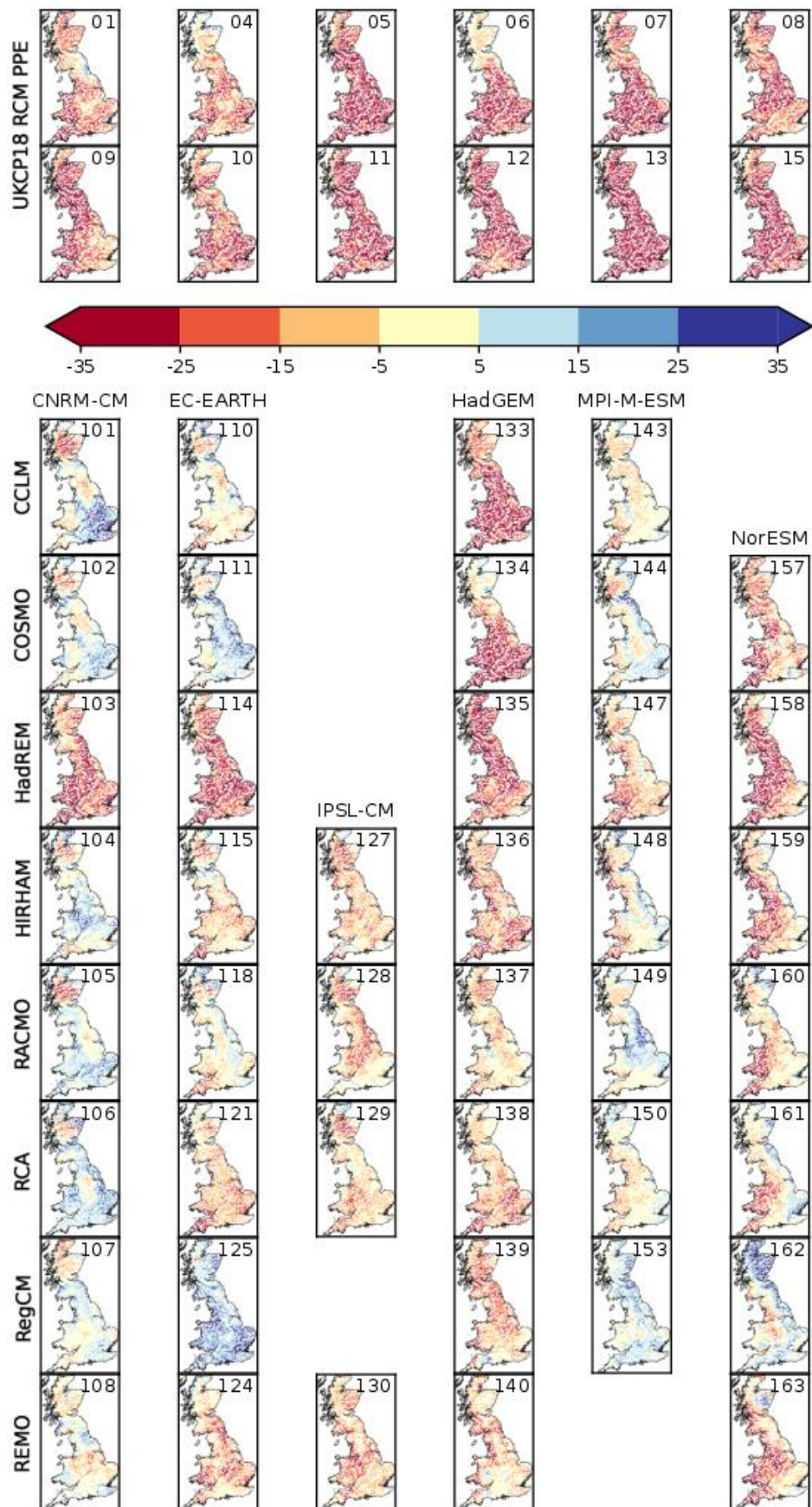
Supp. Figure 1 Taylor diagrams comparing the spatial patterns of change in seasonal mean flows across GB for the UKCP18 ensemble (green crosses) and EC-UK ensemble (blue plus signs) for 1deg-3deg time-slice pair. The reference pattern is taken as the UKCP18 ensemble mean (black circle on the x-axis).



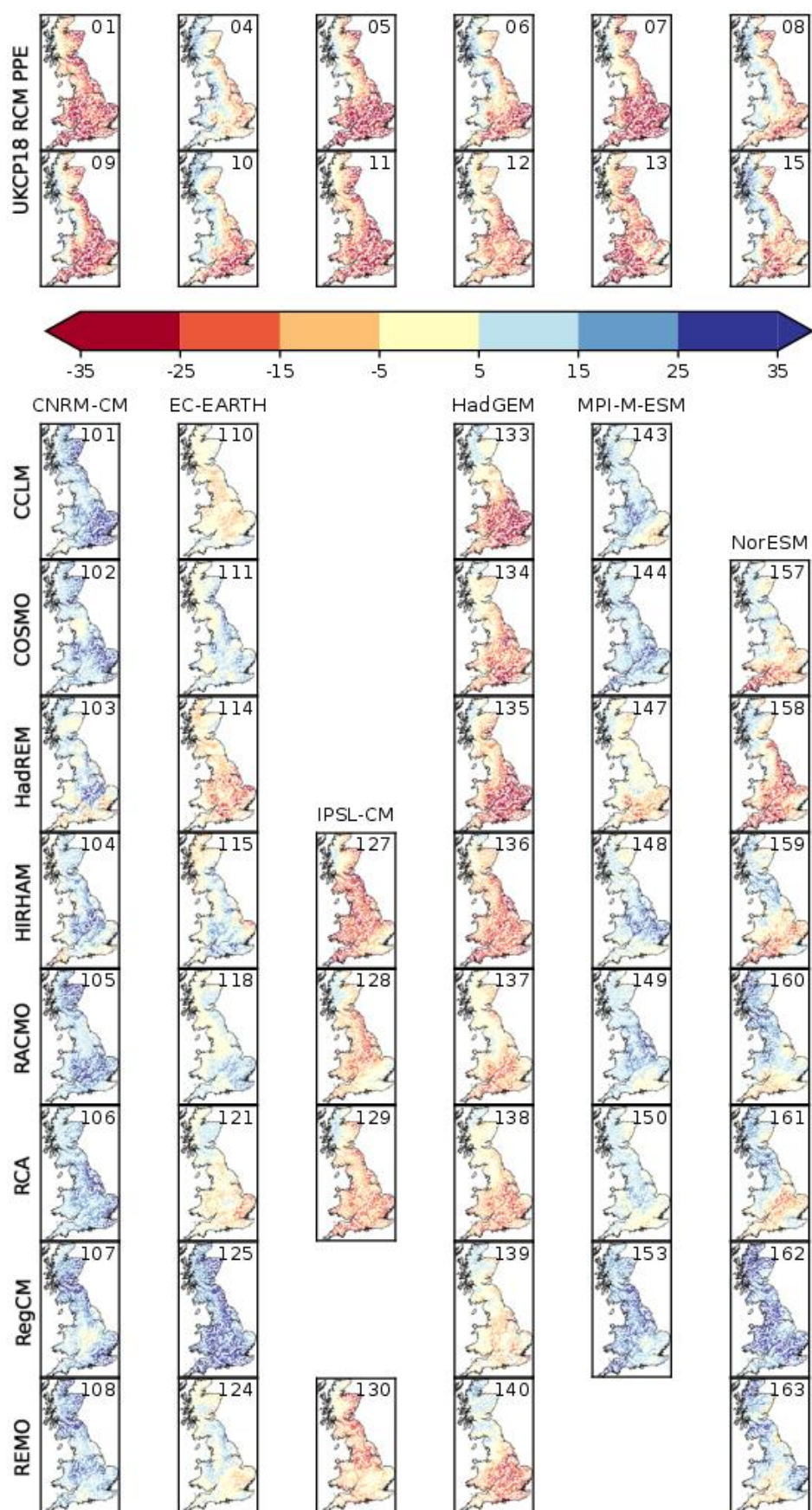
Supp. Figure 2 Maps of percentage change in winter flows for the UKCP18 (top) and EC-UK (bottom) ensembles, between the 1deg and 3deg time-slices.



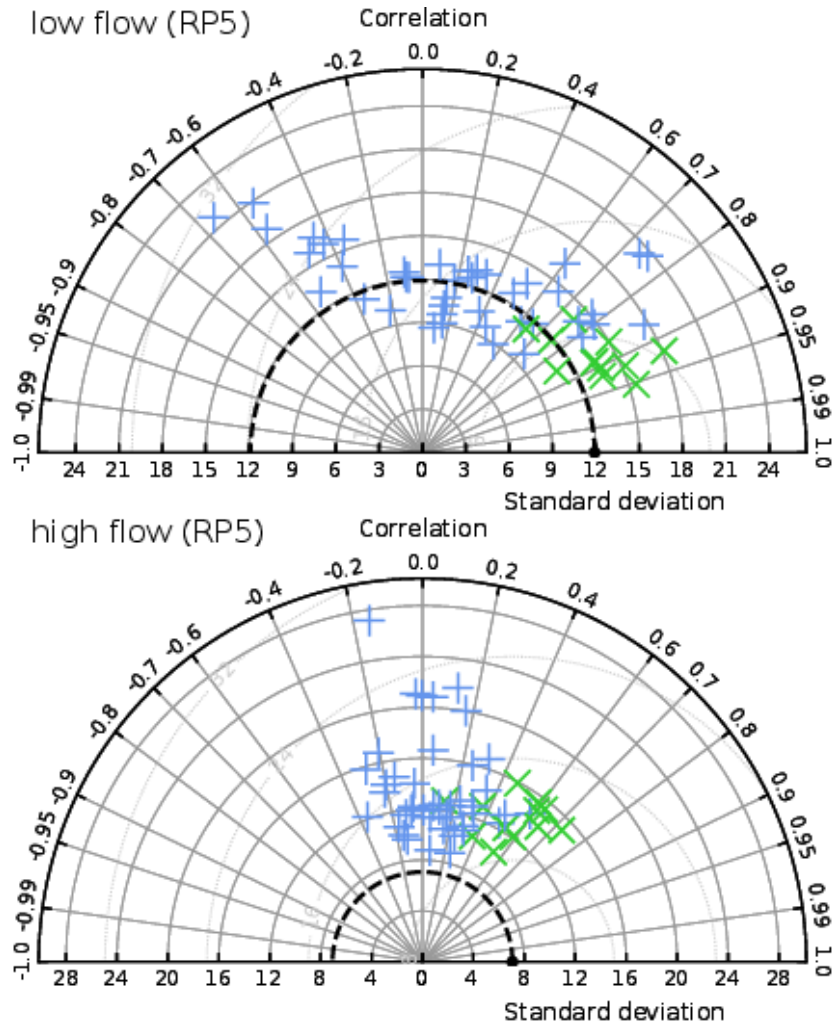
Supp. Figure 3 As Supp. Figure 2 but for percentage change in spring flows.



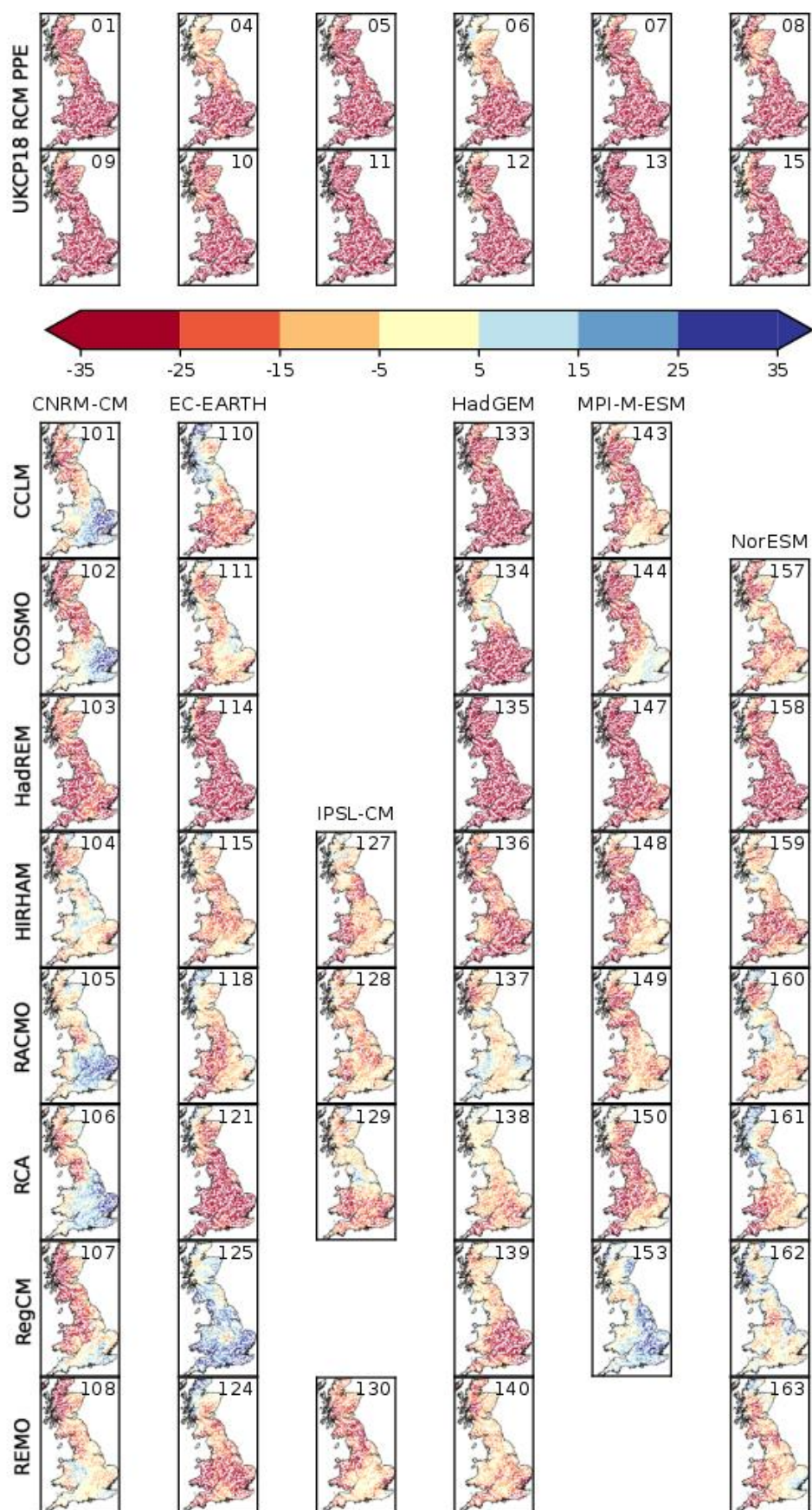
Supp. Figure 4 As Supp. Figure 2 but for percentage change in summer flows.



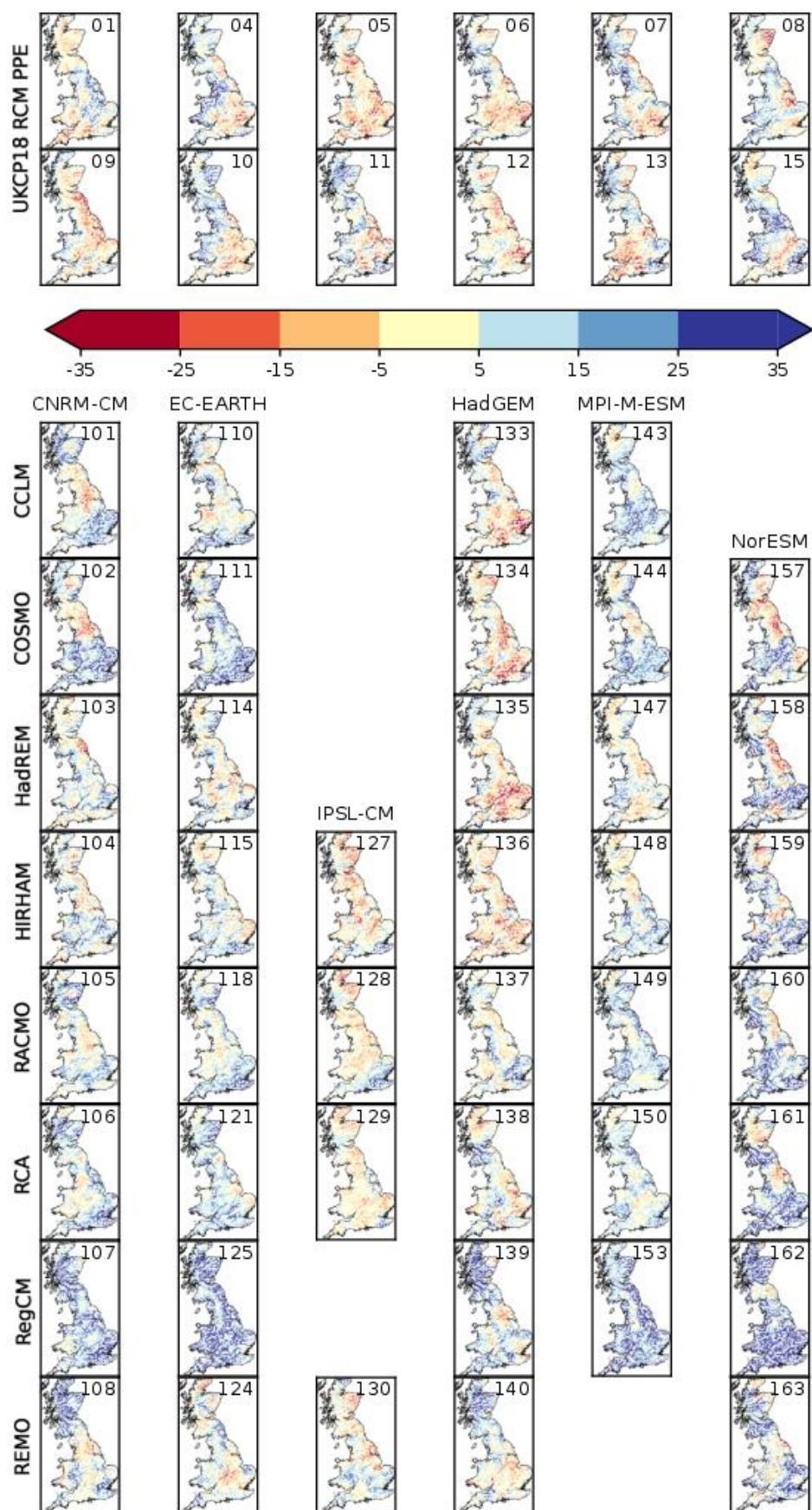
Supp. Figure 5 As Supp. Figure 2 but for percentage change in autumn flows.



Supp. Figure 6 Taylor diagrams comparing the spatial patterns of change in 5-year return period a) low flows and b) high flows across GB for the UKCP18 ensemble (green crosses) and EC-UK ensemble (blue plus signs) for 1deg-3deg time-slice pair. The reference pattern is taken as the UKCP18 ensemble mean (black circle on the x-axis).



Supp. Figure 7 As Supp. Figure 2 but for percentage change in 5-year return period low flows.



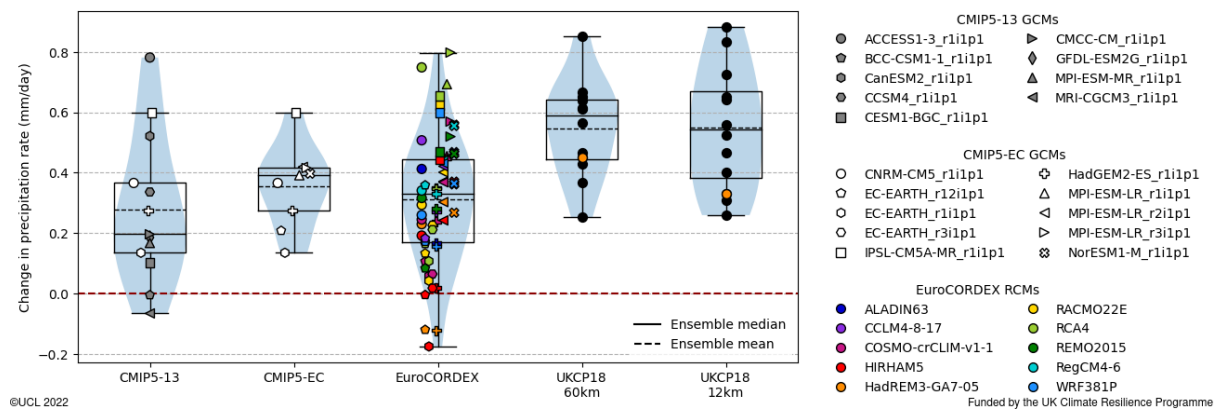
Supp. Figure 8 As Supp. Figure 2 but for percentage change in 5-year return period high flows.

3 Discussion

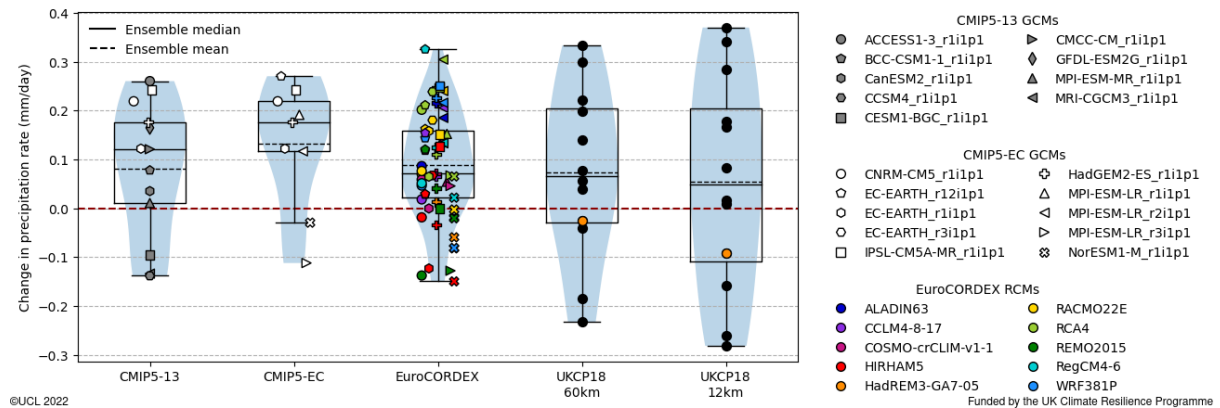
Supp. Figure 9 shows boxplots of the change in UK mean precipitation for each season between fixed baseline and far-future time-slices, for several GCM and RCM ensembles including EuroCORDEX-UK and UKCP18 Regional 12km (from github-pages.ucl.ac.uk/EuroCORDEX-UK-plot-explorer/).

Supp. Figure 10 shows time-series of GB-mean annual PE for the UKCP18 and EC-UK ensembles, alongside observation-based PE from the Met Office Rainfall and Evaporation Calculation System (MORECS).

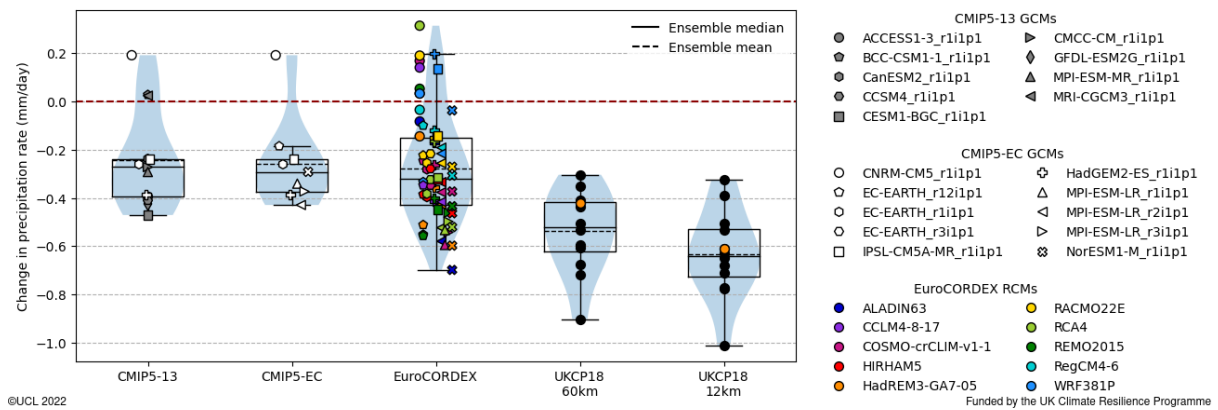
a) Winter



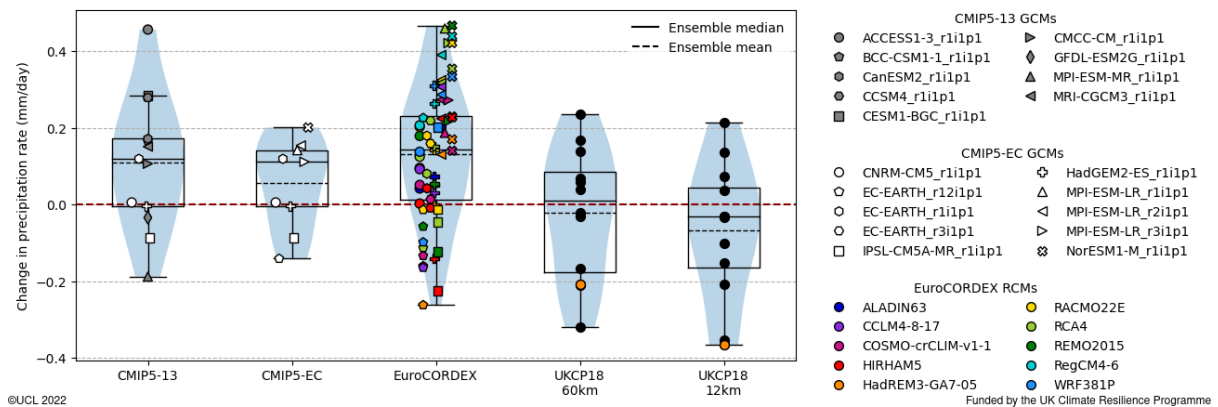
b) Spring



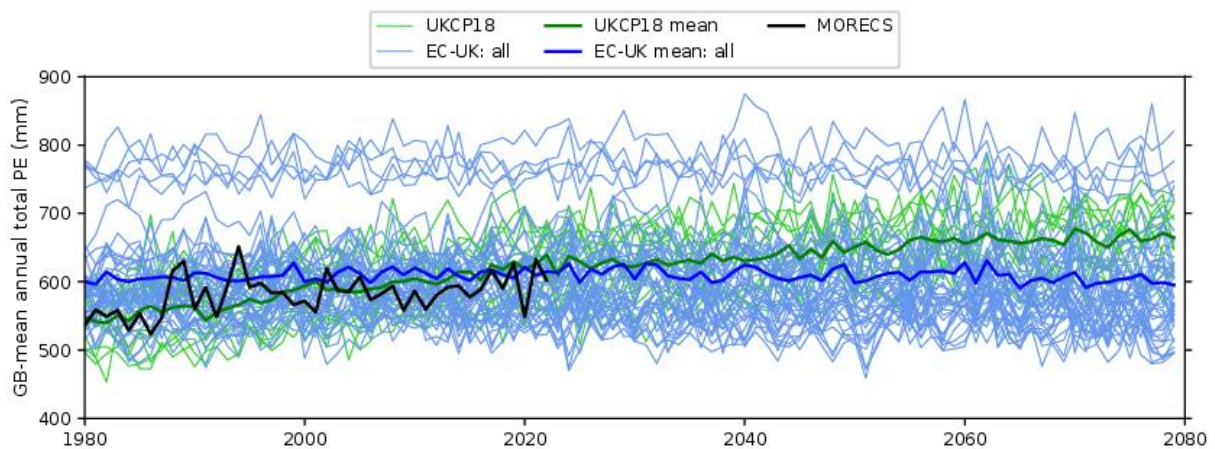
c) Summer



d) Autumn



Supp. Figure 9 Boxplots showing the change in UK mean precipitation (mm/day) for each season (a-d) between fixed baseline and far-future time-slices, for several GCM and RCM ensembles including EuroCORDEX-UK (middle) and UKCP18 Regional 12km (right). Plots taken from github-pages.ucl.ac.uk/EuroCORDEX-UK-plot-explorer/, reproduced under [CC BY-NC 4.0 license](https://creativecommons.org/licenses/by-nc/4.0/).



Supp. Figure 10 Time-series of GB-mean annual PE for the UKCP18 and EC-UK ensembles. Also shown is observation-based PE from MORECS.